Electronic supplementary information (ESI) for

Two liquids wetting properties as a surface polarity probe for hydrophobic coatings

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S1: samples preparation

One and two liquids contact angle measurements have been performed on a Kruss easydrop[®] goniometer and contact angle has been measured with the associated software Drop Shape Analysis. Dodecane, octane, diodomethane, ethylene glycol, bromonaphtalene have been purchased from Sigma Aldrich and used without further purification. Aqueous solutions of variable pH have been obtained diluting hydrochloric acid and sodium hydroxide in ultra-pure water.

Parylene C coatings¹⁵ have been prepared on silica substrate by CVD using a Kisco system. The Dichloro-di-paraxylylene cyclic dimer precursor has been provided by Kisco as diX C. Cytop® CTX 809 has been supplied by AGC Chemicals. Hydrophobic coatings based on fluorinated polymers have been obtained by spin coating of a solution of Cytop (1%wt solution in CT-Solv180) directly spun on the latter dielectric coatings of Parylene C at 4000 rpm for 90 seconds. Samples are then annealed at 50°C for 30 minutes and then at 180°C for 60 minutes. Fluoropel® has been supplied by Cytonix Co. The as-received product has been spun at 6000 rpm on dielectric coatings of Parylene C, then baked for 30min at 50° followed by 60min at 120°C on a hot plate. SiOC layers have been deposited by plasma enhanced chemical vapor deposition (PECVD). The precursor has been supplied by Acros Organic.

Table 1	Y	۲d	Хp
	(mJ/m²)	(mJ/m²)	(mJ/m²)
Water (W) ¹⁷	72.8	26	46.8
Ethylene Glycol (EG) 18	47.5	26.4	21.1
W/EG 50:50 (vol) ¹⁹	57.9	20	37.9
W/EG 10:90 (vol) ¹⁹	50.5	19.1	31.3
Diiodomethane ²⁰	50.8	50.8	0
1-Bromonaphtalene	44.6	44.4	0.2
Octane ²¹	21.6	21.6	0
Decane ²¹	23.8	23.8	0

S2 reference liquids

Table 1: Liquids and respective surface tensions used for the determination of surface energy polar and dispersive components from coatings using both methods.

S3 Interfacial tensions

Table 2	Interfacial Tension (mJ/m ²)
Water (W) :Ethylene Glycol (EG) (90:10) /Br-Naphtalene	31.9
W:EG (50:50) /Br-Naphtalene	37.4
W:EG (90:10) /Diodomethane	39
W:EG (50:50) /Diodomethane	45
W:EG (90:10)/Octane	31.5
Water/Octane	47
Ethylene Glycol/Octane	21.3
Water/Br-Naphtalene	43.3
Water/Diodomethane	50.9

Table 2: Interfacial tension for the liquid couples described for the calculation of Parylene C free energy, calculated based on equation 2.

S4 surface energy measurement on coatings

	1 Liq			2 Liqs		
	γ (mJ/m²)	⊻ ^d (mJ/m²)	لا ^p (mJ/m²)	γ (mJ/m²)	⊻ ^d (mJ/m²)	¥ ^p (mJ/m²)
Parylene C 1	41.6 ± 0.03	41.2 ± 0.01	0.39 ± 0.02	51.14 ± 0.01	51.04 ± 0.06	0.09 ± 0.003
Parylene C 2	41.8 ± 0.03	41.2 ± 0.013	0.6 ± 0.015	55.1 ± 0.06	55 ± 0.06	0.14 ± 0.002
Parylene C 3	42.4 ± 0.02	41.6 ± 0.01	0.8 ± 0.01	56.1 ± 0.04	56 ± 0.04	0.11 ± 0.001
Parylene C 4	39.4 ± 0.1	37.4 ± 0.06	2 ± 0.06	42.2 ± 0.007	42.2 ± 0.007	0.04 ± 0.0002
Parylene C 5	40.4 ± 1	37.7 ± 0.5	2.7 ± 0.5	49.9 ± 0.01	49.8 ± 0.01	0.1 ± 0.0004
Fluoropel1	11.1 ± 0.04	10.6 ± 0.02	0.5 ± 0.02	12.5± 0.1	12.5 ± 0.1	0.004 ± 0.005
Fluoropel2	11.5 ± 0.04	11.4 ± 0.02	0.1 ± 0.02	11.5 ± 0.1	11.5 ± 0.09	0.01 ± 0.004
Fluoropel3	11.4 ± 0.06	11.2 ± 0.03	0.2 ± 0.03	10.1 ± 0.01	10.1 ± 0.01	0.01 ± 0.0008
Cytop1	11.7 ± 0.06	10.9 ± 0.03	0.8 ± 0.03	21.4 ± 0.01	21.4 ± 0.01	0.003 ± 0.0005
Cytop2	15.0 ± 0.08	15.0 ± 0.04	0.01 ± 0.04	17.3 ± 0.04	17.3 ± 0.04	0.008 ± 0.002
Cytop3	13.2 ± 0.06	13.0 ± 0.03	0.2 ± 0.03	11.5 ± 0.09	11.5 ± 0.09	0.01 ± 0.004
SiOC1	24.1 ± 0.2	24.1 ± 0.2	0.03 ± 0.02	24.1 ± 0.2	24.1 ± 0.2	0.07 ± 0.02
SiOC2	24.6 ± 0.06	24.6 ± 0.03	0.04 ± 0.06	25.3 ± 0.1	24 ± 0.1	0.05 ± 0.09

S5 chemical structure of fluoropel:



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